

EXPLANATION OF THE PLATES.

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5. On some Nemerteans from Torres Straits.

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(Plates LIV. & LV.)

The specimens of Nemerteans which I now propose to describe were collected by Prof. Haddon in Torres Straits during the year 1889. Most of the species have been previously named, the only new species being three Lineidæ. In none of these specimens was the whole animal preserved, so that it is impossible to say whether a caudal appendage was present or not; yet, although the chief feature relied upon in the existing system of classification for the determination of the genus was absent, the fragments in each instance comprised the whole of the anterior end, the anatomy of which is sufficient to distinguish them from any species of the family yet described. Consequently I have thought it advisable to give them specific names whilst assigning them provisionally to the genus *Cerebratulus*.

HETERONEMERTINI.

Fam. EUPOLIDÆ.

EUPOLIA DELINEATA.

Eupolia delineata Delle Chiaje, 1825; Bürger (2) p. 234.

Fragments of a single specimen about 2.5 mm. in breadth. The chocolate-coloured lines are well preserved by the chromic acid in which the animal was fixed; they are perfectly continuous and number about 24 in all, those on the dorsal surface being rather more numerous and more clearly marked. In these respects it resembles a specimen described by Bürger from Java (2. p. 234), rather than those found at Naples, in which the lines are fewer and more broken. The absence of head-slits, the relative positions of

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the dorsal and ventral ganglia, and the relative thickness of the epithelium and cutis, all show that this specimen belongs to the species *delineata* and not to *curta*. The nephridia, however, possess several openings on each side, and this fact, in view of Bürger's statement (3. p. 601) that there is only a single pair in *E. delineata*, led me to examine a specimen of *delineata* which I procured whilst at Naples. Here there were five openings on one side and seven on the other, which seems to show that Bürger's statement is probably inexact. In all the other members of this family whose excretory system has been worked out by Hubrecht (8. p. 115), Oudemans (4. p. 144), or by myself (5 & 6), there have always been more than one pair of ducts present, with the exception of *E. henprichi*, in which (5) they were altogether absent.

EUPOLIA MELANOGRAMMA.

Eupolia melanogramma Punnett (6), 1900, = *E. quinquelineata*, Bürger (2).

A very large specimen of this species was obtained, measuring 190 cm. in length and about 2.4 cm. in breadth at the thickest, with a dorso-ventral depth of 7 mm. Five dorsal lines were present, all being well marked and unbroken. This worm is one of the largest Nemerteans recorded, being only exceeded in bulk by a specimen of *Lineus longissimus* recorded by McIntosh¹ and a specimen of *Cerebratulus lacteus* measured by Verrill (7. p. 435). The internal anatomy of the species has already been described by Punnett (6) and Bürger (2).

Fam. LINEIDÆ.

LINEUS ALBOVITTATUS Bürger.

A single specimen of this easily recognized species was procured. In the preserved state it measures about 9 cm. in length and 5 mm. in breadth at the middle of the body. It appears to be a fairly plentiful species with a wide distribution, having been recorded by Stimpson² from Loo-choo, by Bürger (1) from Amboina, Timor, Matuka, and Mauritius, and by myself (5) from New Britain.

CEREBRATULUS COLORATUS Bürger.

A fragment 9 cm. long and 1 mm. in diameter is probably to be referred to this species, as the markings agree with the description given by Bürger (1). Unfortunately the anterior portion is missing.

CEREBRATULUS TORRESIANUS, n. sp. (Plate LIV. figs. 1 a-e, 3, & 6.)

About 4 cm. of fragments including the anterior end, and having an average width of about 1.8 mm. The head-slits measured 2.5 mm.

¹ British Annelids: The Nemerteans, p. 183.

² Proc. Acad. Nat. Sci. Philad. vol. vii., 1856.

in length and reached rather over the mouth which was 2 mm. long. Colour in life a uniform brown.

The *epithelium* contains in its outer part a number of granular unicellular gland-cells (fig. 3). It rests on a well-developed basement-membrane (*bm.*), beneath which is the outer longitudinal muscle-layer of the body-wall. Squeezed in between the muscles are the somewhat scanty cutis-glands (*cgl.*). There is no connective-tissue layer (Bindgewebsschicht).

The *muscular system* presents no features of special interest. There is no diagonal muscle-layer.

In the *vascular system* there is a well-marked head-loop anteriorly. The dorsal blood-vessel quits the proboscis-sheath at the level of the posterior termination of the excretory system, and at this same level the oesophageal lacunæ cease, becoming confluent with the two lateral blood-vessels, which at this level are very large.

The *proboscis* is lacking.

The *proboscis-sheath* contains the usual outer longitudinal and inner circular muscle-layers.

The *alimentary canal* possesses a small ventral gutter.

The *generative sacs* contained ova.

The *excretory system* commences some little way behind the mouth (fig. 6). On both sides there is a duct opening to the exterior near its posterior end. On the left side there is an additional duct at the anterior end. The system lies for its whole extent dorsal to the level of the side stems.

In the *nervous system* the median dorsal nerve is scarcely differentiated from the nervous sheath surrounding the circular muscle-layer. Anteriorly well-marked head-nerves are given off the dorsal ganglion. The dorsal commissure is stronger than is usual in the group, and is given off slightly behind the level of the ventral one. In both the dorsal and ventral ganglia and in the side stems the central fibrous core is unusually large in comparison with the thickness of the ganglion-cell layer. Neurochord-cells occur in the brain at the level of the ventral commissure. The dorsal lobe of the dorsal ganglion is large and reaches back some way (fig. 1 a-c, *ddg.*).

The *cerebral organ* is rounded in form and is partly covered by gland-cells both above and below.

The *head-slits* are deep, reaching nearly to the brain. Even after the ciliated canal has been given off, they remain deep for a considerable distance (fig. 1 a-d, *hs.*, & fig. 6, *hs.*).

Eyes are probably represented by small structures lying dorsal to the head-slits in the snout, though in the absence of a well-marked pigmentary layer (which may have been extracted by the long sojourn in spirit) it is impossible to be certain.

The *frontal organ* is well marked.

The *head-glands* are scanty and soon fuse with the cutis-glands.

CEREBRATULUS QUEENSLANDICUS, n. sp. (Plate LIV. figs. 2 a-e, 4, & 5.)

Fragments of the anterior portion of a single specimen were

procured. Width about 2.5 mm. The head-slits are very long, extending over 5 mm. The posterior 3 mm., however, are very shallow. The mouth commences at about the termination of the deep portion of the head-slits and is about 3 mm. in length. After preservation the colour was dark olive-brown. Starting from about .5 mm. from the tip of the snout, a paler dorsal band about 1 mm. in breadth reached backwards.

The *epithelium* contains a number of large granular unicellular glands in its deeper portion. Beneath the thin basement-membrane is a layer of longitudinal muscle-fibrils in the *cutis*, and underneath these again are the cutis-glands and the connective-tissue layer of the cutis. Dorso-laterally for a small portion of the circumference, as seen in transverse section, the cutis is modified on each side by the presence of an enormous quantity of what appear to be small rhabdites (fig. 4, *rh.*). They take a very vivid colour with picric acid, and may easily be traced through the cutis-muscles (*mle.*), the basement-membrane, and the epithelium.

The *muscle-layers* show no special features. There is no diagonal layer.

In the *vascular system* there is a well-marked head-loop. It was not possible to fix definitely the point of exit of the dorsal vessel, as the fragment cut only just included the excretory system. At this level the vessel still ran in the sheath.

The *proboscis* was lacking.

The *proboscis-sheath* shows the usual inner longitudinal and outer circular muscle-layers.

The *excretory system* commences at the posterior limit of the cerebral organ (fig. 5). It lies wholly dorsal to the level of the side stems. There is a single duct on each side near its middle portion.

In the *nervous system* the median dorsal nerve is well marked. The dorsal commissure in the brain is very posteriorly situated, not being given off until after the separation of the dorsal from the ventral ganglia. Neurochord-cells are present at the level of the ventral commissure. The dorsal lobe of the dorsal ganglion is large. The brain as a whole is much flattened, as, indeed, is the whole of the fragment by which this species is at present represented.

The *cerebral organ* is elliptical in shape, being flattened dorso-ventrally. Gland-cells are found above and below (fig. 2 c-e). A portion open into the ciliated canal before it joins the dorsal ganglion (fig. 2 a).

The *frontal organ* is well marked.

Eyes are probably absent.

The *head-glands* are very short and soon become fused with the cutis-glands.

This species bears some resemblance to that described by Bürger (1) under the name of *Cerebratulus spadix*, but seems to be distinguished from it by the vascular head-loop and by the fact that the mouth commences before the termination of the cerebral organs. The curious agglomeration of rhabdites also seems peculiar.

CEREBRATULUS HADDONI, n. sp. (Plate LV. figs. 7 a-e, 8, & 9.)

About 5 cm. of fragments of a single specimen from Thursday Island. The œsophageal region is round and about 6 mm. in diameter. In the intestinal region the breadth is about 8 mm., the depth being 5 mm. The mouth is large. The head-slits extend backwards to the level where the mouth commences. Colour in the preserved state whitish grey, covered with darker mottlings except on the snout.

The *epithelium* in the œsophageal region contains a few large granular cells (Stäbchenzellen) in its deeper portion. There is no well-marked basement-membrane. The *cutis* presents the fine circular and longitudinal muscle-fibrils. The cutis-glands are poorly developed. The connective-tissue layer (fig. 8, *cu.*) is very strong, being almost as thick as the powerful external longitudinal muscle-layer. It contains a very few muscle-fibrils.

The *muscle-layers* are all well developed.

The *vascular system* shows a well-marked head-loop.

The *proboscis* is of moderate size, but presents no muscle-crosses.

The *proboscis-sheath* contains the usual outer circular and inner longitudinal muscle-layers. The latter is more strongly developed ventrally than dorsally.

The *alimentary canal* possesses a wide, shallow, ventral gutter in the intestinal region.

The *excretory system* starts some way behind the mouth and extends over about 2 mm. in the preserved specimen (fig. 9). I have been able to observe no openings to the exterior¹. The œsophageal vascular lacunæ are very small. The excretory tubules lie wholly ventral to the level of the side stems.

The *generative sacs* are small, numerous, and scattered in the intestinal region, thus not conforming to the usual arrangement, in which there is a single sac between each successive pair of intestinal pouches. Apparently the ducts are not yet developed.

In the *nervous system* the brain presents no special features. Neurochord-cells are not present at the level of the ventral commissure. The median dorsal nerve is not distinguishable from the rest of the nervous sheath surrounding the circular musculature. An inferior median dorsal nerve, lying just above the proboscis-sheath, is well marked in this species.

The *cerebral organ* is seen in section before the separation of the dorsal and ventral lobes of the dorsal ganglion (fig. 7 b). It is invested by gland-cells only on its ventral surface.

The *head-slits* are deep, reaching almost to the brain. Externally they end abruptly before the level where the cerebral organ commences (fig. 9).

Eyes and *frontal organ* are both absent.

The *head-glands* are very scanty and end early.

¹ Cf. *C. robustus* (Punnett, 6), which this species greatly resembles with regard to its excretory and vascular systems.

In conclusion, the leading features of these three new species may be briefly characterized as follows:—

- C. torresianus*.—Size small. Basement-membrane stout. Cutis without connective-tissue layer, its place being taken by longitudinal muscle-fibres. Vascular head-loop. Neurochord-cells. Head-slits remain deep some distance behind cerebral organ. No eyes. Well-marked frontal organ. Excretory system starts behind mouth and has few ducts.
- C. queenslandicus*.—Size small. Dorso-ventrally flattened. Cutis packed with rhabdites at certain parts. Vascular head-loop. Neurochord-cells. Head-slits prolonged far behind cerebral organ as very shallow canals. No eyes. Well-marked frontal organ. Excretory system commences at lacunæ of cerebral organ and has one pair of ducts.
- C. haddoni*.—Size fairly large. Much thickened. Connective-tissue layer of cutis extremely thick. Cutis-glands much reduced. Vascular head-loop. Proboscis without muscle-crosses. No neurochord-cells. Eyes and frontal organ both absent. Excretory system commences some way behind mouth and is without ducts.

List of Papers referred to.

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- (5) PUNNETT, R. C.—Some Nemerteans from the Pacific. Willey's Zoological Results, Pt. v., 1900. (In the press.)
- (6) ——. On a Collection of Nemerteans from Singapore. Quart. Journ. Mic. Sci., vol. 44, 1900.
- (7) VERRILL, A. E.—The Marine Nemerteans of New England and adjacent waters. Trans. Connecticut Acad. vol. xiii., 1892.
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P.S.—Since this paper was read, Prof. Haddon has kindly supplied me with the following notes on several of the living worms:—

EUPOLIA DELINEATA (p. 825).

From reef, Waier, Murray Is. Colour buff, with very fine interrupted longitudinal brown lines, about a dozen in number, on both dorsal and ventral aspect. The lines are more deeply coloured and more definite in form on the dorsal surface.

